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10/649,909	08/26/2003	Satyanarayana Dharanipragada	YOR920030259US1	5755

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THE LAW OFFICE OF IDO TUCHMAN
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KEW GARDENS, NY 11415

EXAMINER

LENNOX, NATALIE

ART UNIT	PAPER NUMBER
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2626

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09/24/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

<p align="center">Office Action Summary</p>	Application No. 10/649,909	Applicant(s) DHARANIPRAGADA ET AL.	
	Examiner Natalie Lennox	Art Unit 2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 June 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 June 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

The amendment to the claims filed on June 26, 2007 does not comply with the requirements of 37 CFR 1.121(c) because there was a failure to provide the correct status of every claim, and a failure to indicate with markings the current amendments of claims 1, 5, 6, 10, and 12 as stated in the list of claims and remarks filed. Amendments to the claims filed on or after July 30, 2003 must comply with 37 CFR 1.121(c) which states:

(c) *Claims.* Amendments to a claim must be made by rewriting the entire claim with all changes (e.g., additions and deletions) as indicated in this subsection, except when the claim is being canceled. Each amendment document that includes a change to an existing claim, cancellation of an existing claim or addition of a new claim, must include a complete listing of all claims ever presented, including the text of all pending and withdrawn claims, in the application. The claim listing, including the text of the claims, in the amendment document will serve to replace all prior versions of the claims, in the application. In the claim listing, the status of every claim must be indicated after its claim number by using one of the following identifiers in a parenthetical expression: (Original), (Currently amended), (Canceled), (Withdrawn), (Previously presented), (New), and (Not entered).

(1) *Claim listing.* All of the claims presented in a claim listing shall be presented in ascending numerical order. Consecutive claims having the same status of "canceled" or "not entered" may be aggregated into one statement (e.g., Claims 1–5 (canceled)). The claim listing shall commence on a separate sheet of the amendment document and the sheet(s) that contain the text of any part of the claims shall not contain any other part of the amendment.

(2) *When claim text with markings is required.* All claims being currently amended in an amendment paper shall be presented in the claim listing, indicate a status of "currently amended," and be submitted with markings to indicate the changes that have been made relative to the immediate prior version of the claims. The text of any added subject matter must be shown by underlining the added text. The text of any deleted matter must be shown by strike-through except that double brackets placed before and after the deleted characters may be used to show deletion of five or fewer consecutive characters. The text of any deleted subject matter must be shown by being placed within double brackets if strike-through cannot be easily perceived. Only claims having the status of "currently amended," or "withdrawn" if also being amended, shall

include markings. If a withdrawn claim is currently amended, its status in the claim listing may be identified as "withdrawn—currently amended."

(3) *When claim text in clean version is required.* The text of all pending claims not being currently amended shall be presented in the claim listing in clean version, *i.e.*, without any markings in the presentation of text. The presentation of a clean version of any claim having the status of "original," "withdrawn" or "previously presented" will constitute an assertion that it has not been changed relative to the immediate prior version, except to omit markings that may have been present in the immediate prior version of the claims of the status of "withdrawn" or "previously presented." Any claim added by amendment must be indicated with the status of "new" and presented in clean version, *i.e.*, without any underlining.

(4) *When claim text shall not be presented; canceling a claim.*

(i) No claim text shall be presented for any claim in the claim listing with the status of "canceled" or "not entered."

(ii) Cancellation of a claim shall be effected by an instruction to cancel a particular claim number. Identifying the status of a claim in the claim listing as "canceled" will constitute an instruction to cancel the claim.

(5) *Reinstatement of previously canceled claim.* A claim which was previously canceled may be reinstated only by adding the claim as a "new" claim with a new claim number.

Response to Arguments

1. Applicant's arguments filed on June 26, 2007 have been fully considered but they are not persuasive.

As per claim rejections under 35 U.S.C. § 101 directed to claims 11-15 and 24-27, examiner agrees with applicant that "when a computer program is recited in conjunction with a physical structure, such as a computer memory, USPTO personnel should treat the claim as a product claim." However, the rejection was directed toward the computer program product (emphasis added). There is no description or definition found in applicant's disclosure regarding the computer program product. Therefore, there is still the uncertainty of what the computer program product is in order to identify

if it belongs to any of the statutory categories, process, machine, manufacture, or composition of matter.

As per claim rejections under 35 U.S.C. § 103 regarding claims 1, 6, 11, and 16, applicant argues that “rather than disclosing “creating an independent model based on the first set of training data and the second set of training data if the difference in model information is insignificant,” Chandrasekar states that clusters with insignificant differences are merged.” Examiner respectfully disagrees with applicant because the act of merging the clusters result in the creation of a new different cluster that had not existed prior to the merging. The result of creating a new model based on two other models equates to the result of merging two models to form one model.

2. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Chang et al. receive speech as input, whereas Chandrasekar et al. receive a text string, however, it would have been obvious to a person having ordinary skill in the art at the time of the invention to transform an audio signal using a speech recognizer into text. Moreover, Chandrasekar's Col. 4, lines 47-55, specify that “A user may enter commands and information into personal computer 100 through a keyboard and pointing device, such

as a mouse. Other input devices (not shown) may include a microphone, joystick, game pad, satellite dish, scanner, or the like.” Therefore, the facts that Chandrasekar’s clusters are composed of words or phrases previously received as queries and the fact that a user may input information through a microphone, clearly suggests that queries might be entered as speech and processed to obtain a text string for further processing by the system.

As per claim rejections under 35 U.S.C. § 103 regarding claims 17, 21, and 24, applicant argues that there was no motivation to combine the teachings of Wark and Verma.

3. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, applicant argues that “according to Verma, “in decision fusion applications, multiple classifiers (or experts) perform separate classification experiments on respective data sets, and consequently designate a nominated class as correct,” whereas Wark teaches a classifier based on a continuous distribution function defining the distribution of the feature vectors for the object classification. Examiner respectfully disagrees with applicant given the fact that both references are directed towards classification systems

and methods. More specifically Wark is directed towards classification of objects in audio (title), and Verma suggests that her method may apply to speech recognition (paragraphs [0002] and [0023]). Further, both references produce the same results of classifying an object or sample (Wark's and Verma's paragraph [0001]), even if Verma uses multiple classifiers in order to improve classification accuracy (Verma's paragraph [0010]).

Claim Rejections - 35 USC § 101

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-10, 16-20 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. As per claims 1-10 and 16-20, the methods and systems claimed consist solely of mathematical operations without some practical application. If the "acts" of a claimed process manipulate only numbers, abstract concepts or ideas, or signals representing any of the foregoing, the acts are not being applied to appropriate subject matter. Thus, a process consisting solely of mathematical operations, i.e., converting one set of numbers into another set of numbers, does not manipulate appropriate subject matter and thus cannot constitute a statutory process.

Claim Rejections - 35 USC § 103

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

1. Claims 1, 6, 11, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chang et al. (US Patent 6,567,776) in view of Chandrasekar et al. (US Patent 6,578,032).

As per claims 1 and 11, Chang et al. teach a method and computer program product comprising:

receiving a first model based on a first set of training data, the first set of training data originating from a first set of common entities (cluster model 202, Col. 2, lines 35-41, also Fig. 2 shows the two speaker cluster models 202 and 204, each of the speaker cluster model having substantially similar characteristics); and

receiving a second model based on a second set of training data, the second set of training data originating from a second set of common entities (cluster model 204, Col. 2, lines 35-41, also Fig. 2 shows the two speaker cluster models 202 and 204, each of the speaker cluster model having substantially similar characteristics); but Chang et al. doesn't specifically disclose:

determining the difference in model information between the first model and the second model; and

creating an independent model based on the first set of training data and the second set of training data if the difference in model information is insignificant.

However Chandrasekar et al. teach a cluster A and a cluster C for which a difference between clusters has been determined to be insignificant. As a result cluster A is merged with cluster C forming a newly merged cluster (Col. 10, lines 59-61 and 65-66). It would have been obvious to one having ordinary skill in the art to have used the

features of determining a difference between models and creating an independent model as taught by Chandrasekar et al. for Chang et al.'s method and computer program product because Chandrasekar et al.'s invention automatically analyzes a text string and either updates an existing cluster or creates a new cluster (Col. 2, lines 2-4).

As per claims 6 and 16, Chang et al. teach a system for generating recognition models comprising:

a first model based on a first set of training data the first set of training data originating from a first set of common entities (cluster model 202, Col. 2, lines 35-41, also Fig. 2 shows the two speaker cluster models 202 and 204, each of the speaker cluster model having substantially similar characteristics); and

a second model based on a second set of training data, the second set of training data originating from a second set of common entities (cluster model 204, Col. 2, lines 35-41, also Fig. 2 shows the two speaker cluster models 202 and 204, each of the speaker cluster model having substantially similar characteristics); but Chang et al. doesn't specifically disclose:

a processing module configured to create an independent model based on the first set of training data and the second set of training data if the difference in model information between first model and the second model is insignificant.

However Chandrasekar et al. teach a cluster A and a cluster C for which a difference between clusters has been determined to be insignificant. As a result cluster A is merged with cluster C forming a newly merged cluster (Col. 10, lines 59-61 and 65-66). It would have been obvious to one having ordinary skill in the art to have used the

features of determining a difference between models and creating an independent model as taught by Chandrasekar et al. for Chang et al.'s system for generating recognition models because Chandrasekar et al.'s invention automatically analyzes a text string and either updates an existing cluster or creates a new cluster (Col. 2, lines 2-4).

2. Claims 2, 7, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chang et al. (US Patent 6,567,776) in view of Chandrasekar et al. (US Patent 6,578,032) as applied to claims 1,6, 11, and 16 above, and further in view of Kanevsky et al. (US Patent 6,529,902).

As per claims 2, 7, and 12, Chang et al. as modified by Chandrasekar et al. teach the method, system, and computer program product according to claims 1,6, and 11, but don't specifically disclose whether the model information is insignificant is based on a threshold model quantity. Kanevsky et al. teaches the Kullback-Leibler distance between any two topics is at least h , where h is some sufficiently large threshold (Col. 5, lines 9-11). Further, Kanevsky et al. teaches using Kullback-Leibler distance, one can check which pairs of topics are sufficiently separated from each other. Topics that are close in this metric could be combined together (Col. 12, lines 44-47). It would have been obvious to one having ordinary skill in the art to have used the feature of a threshold model quantity as taught by Kanevsky et al. for Chang et al.'s method, system, and computer program product as modified by Chandrasekar et al. because

Kanevsky et al. provides an improved language modeling for off-line automatic speech decoding and machine translation (Col. 2, lines 50-52).

As per claims 3, 8, and 13, Chang et al. as modified by Chandrasekar et al. teach the method, system, and computer program product according to claims 1, 6, and 11, but don't specifically disclose that determining the difference in model information includes calculating a Kullback-Leibler distance between the first model and the second model. Kanevsky et al. teaches that for two different sets, one can define a Kullback-Leibler distance using the frequencies of the sets. [With the distance] one can check which pairs of topics are sufficiently separated from each other. Topics that are close in this metric could be combined together (Col. 12, lines 42-47).

As per claims 4, 9, and 14, Chang et al. as modified by Chandrasekar et al. and in further view of Kanevsky et al. teach the method, system, and computer program product according to claims 3, 8, and 13, wherein whether the model information is insignificant is based on a threshold Kullback-Leibler distance quantity (Kanevsky's Col. 5, lines 9-11, the Kullback-Leibler distance between any two topics is at least h , where h is some sufficiently large threshold, also they teach (Col. 12, lines 44-47) that while using the Kullback-Leibler distance, one can check which pairs of topics are sufficiently separated from each other, and that topics that are close in this metric could be combined together).

3. Claims 5, 10, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chang et al. (US Patent 6,567,776) in view of Chandrasekar et al. (US Patent

6,578,032) as applied to claims 1,6, and 11 above, and further in view of Wark (US 2003/0231775).

As per claims 5, 10, and 15, Chang et al. as modified by Chandrasekar et al. teach the method, system, and computer program product of claims 1, 6, and 11, but they don't disclose the first, second, and independent models are Gaussian mixture models. Wark teaches multiple class models defined as Gaussian mixture models (paragraph [0135], the Gaussian mixture model λ_c with $c=1, 2, \dots, C$, where C is the number of class models). It would have been obvious to one having ordinary skill in the art to have defined the models as Gaussian mixture models as taught by Wark for Chang et al.'s method, system, and computer program product as modified by Chandrasekar et al. because Wark's invention relates generally to audio signal processing and, in particular, to the classification of semantic events in audio streams (paragraph [0001]).

4. Claims 17, 21, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wark (US 2003/0231775) in view of Verma et al. (US 2002/0174086).

As per claims 17, 21, and 24, Wark teaches a method, system, and computer program product for recognizing data from a data stream originating from one of a plurality of data classes, comprising:

receiving a current feature vector (paragraph [0139], the segment being classified comprising T clips, and hence being characterized by T clip feature vectors f_t);

and computing a current vector probability that the current feature vector belongs to one of the plurality of data classes (Paragraph [0139] describes equation (30) which calculates the model score between the clip feature vectors f_i of the segment and one of the C object models (C is the number of class models as defined in paragraph [0135]). The model score is the summing of the log of the probability of feature vector f_i belonging to class λ_c .), but Wark doesn't specifically disclose:

computing an accumulated confidence level that the data stream belongs to one of the plurality of data classes based on the current vector probability and on previous vector probabilities;

weighing class models based on the accumulated confidence; and

recognizing the current feature vector based on the weighted class models.

However, Verma et al. teaches an accumulated confidence level that the data stream belongs to one of the plurality of data classes based on the current vector probability and on previous vector probabilities (paragraph [0020], cumulative mean H_i of the sample confidence L_{ij} over a large number of samples is used to measure the overall discrimination capability of the classifier, also paragraphs [0018] and [0019] describe the sample confidence L_{ij} as the log-likelihood of the k th most likely class such that the l_{ijk} s form order statistics, that is $l_{ij1} > l_{ij2} > \dots > l_{ijn}$); weighing class models based on the accumulated confidence (paragraph [0024], a weight w_{ij} is assigned to each classifier as a function of the overall confidence H_i and the sample confidence L_{ij}); and recognizing the current feature vector based on the weighted class models (paragraph [0024], once weights w_{ij} for each classifier are known, each incoming sample can be

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classified in a class by calculating the combined log-likelihood for each class). It would have been obvious to one having ordinary skill in the art to have used the feature of a cumulative confidence level as taught by Verma et al. for Wark's method, system, and computer program product because Verma et al. provides method, system, and computer program product that improves the classification accuracy of particular decision fusion applications such as medical imaging, biometric verification, signature or fingerprint verification, robot vision, speech recognition, image retrieval, expert systems, etc (paragraph [0002]).

As per claims 18, 22, and 25, Wark as modified by Verma et al. teach the method, system, and computer program product according to claims 17, 21 and 24 above, wherein computing the current vector probability includes estimating an a posteriori class probability for the current feature vector. (Wark's equation (30) clearly makes use of $p(f_i/\lambda_c)$ or the probability that feature vector f_i belongs to class λ_c . This conditional probability is equivalent to an a posteriori probability because it is the probability of the feature vector given that it belongs to a certain class).

5. Claims 20 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wark (US 2003/0231775) as modified by Verma et al. (US 2002/0174086) as applied to claims 17 and 24 above, and further in view of Catchpole (US 2005/0251390).

As per claims 20 and 27, Wark as modified by Verma et al. teach the method and computer program product according to claims 17 and 24 above, but they don't

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specifically disclose the method and computer program product further comprising determining if another feature vector is available for analysis. However Catchpole teaches a lexical tree processor that attempts to read the next feature vector from the feature vector buffer and if its not available an error occurs, if the vector is available the tree processor reads the feature vector from the buffer (paragraph [0044], first lines). It would have been obvious to one having ordinary Skill in the art to have used the feature of determining if another feature vector is available for analysis as taught by Catchpole for Wark's method and system as modified by Verma et al. because Catchpole provides a circuit that performs parallel processing of speech parameters (paragraph [0004]).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Natalie Lennox whose telephone number is (571) 270-1649. The examiner can normally be reached on Monday to Friday 9:30 am - 7 pm (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil can be reached on (571)272-7602. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

NL

09/12/2007



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